SECTION 01 64 10

SUBSTITUTION REQUEST FORM

TO: SOLARC Engineering and Energy + Architectural Consulting
Business Office
223 W. 12th Avenue
Eugene, Oregon 97401

PROJECT: Marion County Jail HVAC Improvements
4000 Aumsville Hwy
Salem, Oregon

SPECIFIED ITEM: 23 74 13 (Section) 2.01 (Paragraph) Packaged Roof Top Air Conditioning Units (Description)

The undersigned requests consideration of the following:

PROPOSED SUBSTITUTION: Manufacturer: Luxaire

Attached data includes product descriptions, specifications, drawings, photographs, performance and test data adequate for evaluation of request including identification of applicable data portions.

Attached data also includes description of changes to Contract Documents and proposed substitution requires for proper installation.

The undersigned certifies following items, unless modified by attachments, are correct:

1. Proposed substitution does not affect dimensions shown on drawings.
2. Undersigned pays for changes to building design, including engineering design, detailing, and construction costs caused by proposed substitution.
3. Proposed substitution has no adverse effect on other trades, construction schedule, or specified warranty requirements.
4. Maintenance and service parts available locally or readily obtainable for proposed substitution.

Undersigned further certifies function, appearance, and quality of proposed substitution are equivalent to or superior to specified item.

Submitted by: Steve Carter Signature: Steve Carter (Digitally signed by Steve Carter DN: cn=Steve Carter, o=Johnson Air Products, ou, email=scarter@johnsonair.com, c=US Date: 2014.10.20 08:16:06 -07'00') Firm: Johnson Air Products Address: 2220 SE Ninth Ave Portland, OR 97214 Date: 10/20/2014 Tel: 503.234.5071 Fax: 503.233.0451 Attachments: Submittal Data	For use by Architect / Engineer: ☒ Approved ☐ Approved as noted ☐ Not Approved ☐ Received too late By: B. Jacoby @ Solarc Eng. Date: 10-21-14 Comments:

6.5-12.5 Ton Package

Single Package R-410A Air Conditioner

Project Name: **Jail HVAC Remediation** | Unit Model #: **ZW-07N12AWAZZ5**

Quantity: **1** | System: **ZW-07N12AWAZZ5**

Cooling Performance		
Total capacity	87.3	MBH
Sensible capacity	66.1	MBH
Refrigerant type	R-410A	
Efficiency (at ARI)	12.00	EER
Integrated eff. (at ARI)	13.00	IEER
Ambient DB temp.	105.0	°F
Entering DB temp.	80.0	°F
Entering WB temp.	67.0	°F
Leaving DB temp.	59.6	°F
Leaving WB temp.	57.8	°F
Part load efficiency	14.2	IPLV
Power input (w/o blower)	7.43	kW
Sound power	83	dB(A)

Gas Heating Performance		
Entering DB temp.	60	°F
Heating output capacity (Max)	96	MBH
Supply air	3000	CFM
Heating input capacity (Max)	120	MBH
Leaving DB temp.	89.6	°F
Air temp. rise	29.6	°F
SSE	80.0	%
Stages	2	

Supply Air Blower Performance		
Supply air	3000	CFM
Ext. static pressure	1.0	IWG
Blower speed	884	RPM
Max BHP of Motor (including service factor)	1.73	HP
Duct location	Side	
Motor rating	1.50	HP
Actual required BHP	1.50	HP
Power input	1.40	kW
Elevation	203	ft.
Drive type	BELT	

Electrical Data		
Power supply	460-3-60	
Unit min circuit ampacity	17.9	Amps
Unit max over-current protection	20	Amps

Dimensions & Weight					
Hgt	51 in.	Len	89 in.	Wth	59 in.
Weight with factory installed options					1145 lbs.

Clearances					
Right	12 in.	Front	36 in.	Back	36 in.
Top	72 in.	Bottom	0 in.	Left	36 in.

Note: Please refer to the tech guide for listed maximum static pressures

7.5 Ton

- Luxaire Ovation units are manufactured at an ISO 9001 registered facility and each rooftop is completely computer-run tested prior to shipment.

Unit Features

- Unit Cabinet Constructed of Powder Painted Steel, Certified At 1000 Hours Salt Spray Test (ASTM B-117 Standards)
- Through-the-Curb and Through-the-Base Utility Connections
- Either supply and/or return can be field converted from vertical to horizontal configuration without cutting panels.
- Full perimeter base rails with built in rigging capabilities
- Hinged Access Panels
- Slide-Out Condensate Drain Pan
- Reciprocating Compressor
- Two Stage Cooling
- Solid Core Liquid Line Filter Driers
- Microchannel Condenser Coil
- 120 MBH Input Aluminized Steel, Two Stage Gas Heat
- 1.5 HP Standard Static Belt Drive Blower
- Unit Ships with 2" Pleated Filters (MERV 7) with a Standard Filter Rack that will Accept up to 4" Filters
- Single Point Power Connection
- Short Circuit Current: 5kA RMS Symmetrical

Standard Unit Controller: Simplicity Control Board

- An integrated low-ambient control, anti-short cycle protection, lead-lag, fan on and fan off delays, low voltage protection, on-board diagnostic and fault code display.
- Safety Monitoring - Monitors the high and low-pressure switches, the freezestats, the gas valve, if applicable, and the temperature limit switch on gas and electric heat units. The unit control board will alarm on ignition failures, safety lockouts and repeated limit switch trips.

BAS Controller

- Simplicity Intelli-Comfort II Controller with SimplicityLINC Gateway to BACnet MS/TP Protocol - Includes Supply Air, Return Air, Outside Air Temp Sensors, and Air Proving Switch

Warranty

- One (1) Year Limited Warranty on the Complete Unit
- Five (5) Year Warranty - Compressors
- Ten (10) Year Warranty - Aluminized Steel Tubular Heat Exchangers

6.5-12.5 Ton Package

Single Package R-410A Air Conditioner

Project Name: **Jail HVAC Remediation**

Unit Model #: **ZW-07N12AWAZZ5**

Quantity: **1**

System: **ZW-07N12AWAZZ5**

Factory Installed Options

ZW-07N12AWAZZ5

Product Category:	**Z**	Single Packaged R-410A Air Conditioner
Product Identifier:	**W**	12.2 EER / 13.0 IEER
Nominal Cooling Capacity:	**-07**	7.5 Ton Two Stage Cooling
Heat Type and Nominal Heat Capacity:	**N12**	120 MBH Input Aluminized Steel, Two Stage Gas Heat
Airflow:	**A**	1.5 HP Standard Static Belt Drive Blower
Voltage:	**W**	460-3-60
Installation Options:	**A**	
Additional Options:	**ZZ**	2" Pleated Filters (MERV 7) Microchannel Condenser Coil Simplicity® Intelli-Comfort II Controller with SimplicityLINC® Gateway to BACnet MS/TP Protocol Composite Drain Pan
Product Generation:	**5**	

Field Installed Accessories

Information is subject to change without notice. Check local codes.

6.5-12.5 Ton Package

Single Package R-410A Air Conditioner

Project Name: **Jail HVAC Remediation** Unit Model #: **ZW-07N12AWAZZ5**

Quantity: **1** System: **ZW-07N12AWAZZ5**

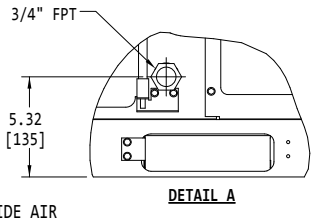
Consolidated Drawing

NOTES:
1. FOR OUTDOOR USE ONLY.
2. WEIGHTS SHOWN ARE FOR COOLING ONLY UNITS.
3. MIN. CLEARANCES TO BE:
   RIGHT SIDE: 12 [305]
   LEFT SIDE: 36 [915]
   FRONT: 36 [915]
   REAR: 36 [915]
   TOP: 72 [1830]
   BOTTOM: 0 [0]
4. TO REMOVE THE SLIDE-OUT DRAIN PAN, A REAR CLEARANCE OF 60 in (1525 mm) IS REQUIRED. IF SPACE IS UNAVAILABLE, THE DRAIN PAN CAN BE REMOVED THROUGH THE FRONT BY SEPARATING THE CORNER WALL.
5. FOR SMALLER SERVICE AND OPERATIONAL CLEARANCES CONTACT YOUR APPLICATION ENGINEERING DEPARTMENT.
6. DOWNFLOW DUCTS DESIGNED TO BE ATTACHED TO ACCESSORY ROOF CURB ONLY. IF UNIT IS MOUNTED SIDE SUPPLY, IT IS RECOMMENDED THAT THE DUCTS ARE SUPPORTED BY CROSS BRACES, AS DONE ON ACCESSORY ROOF CURBS.
7. SIDE DUCT FLANGES ARE 0.75" HIGH. BOTTOM DUCTS DO NOT HAVE FLANGES.
8. MINIMUM CONDENSATION TRAP HEIGHT SHALL BE 1.5 TIMES THE LOWEST NEGATIVE STATIC.
9. DIMENSIONS IN [ ] ARE IN MILLIMETERS OR KILOGRAMS.
10. OPTIONAL COIL GUARDS, POWER EXHAUST, GAS HEAT, ECONOMIZER, DISCONNECT SWITCH, CONVENIENCE OUTLET, AND BAROMETRIC RELIEF AND FRESH AIR HOODS SHOWN.
11. EXCEPT XA (HEAT PUMP) UNITS.

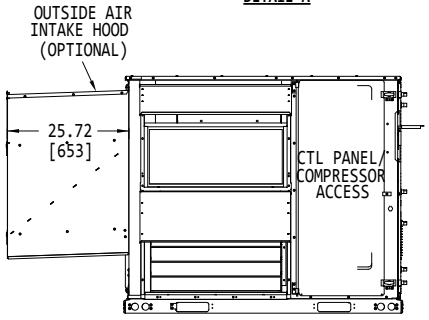
DIRECTION OF AIRFLOW

CENTER OF GRAVITY

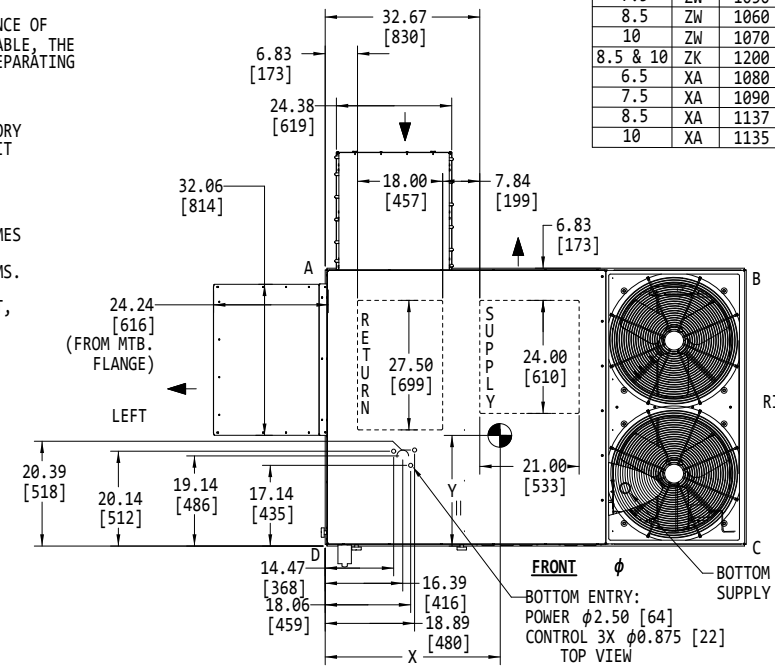
TONNAGE	UNIT	OPERATING WEIGHT (LBS) (BASE UNIT)	CENTER OF GRAVITY LOCATION (BASE UNIT)		4 POINT CORNER LOADS (LBS) (BASE UNIT)			
			X	Y	A	B	C	D
8.5	ZS	1007 [458]	38 [965]	24 [610]	235 [107]	175 [79]	255 [116]	342 [155]
10	ZS	1103 [501]	38 [965]	24 [610]	257 [117]	192 [87]	279 [127]	375 [170]
8.5	ZU	1030 [467]	38 [965]	24 [610]	240 [109]	179 [81]	261 [118]	350 [159]
10	ZU	1090 [494]	38 [965]	24 [610]	254 [115]	189 [86]	276 [125]	371 [168]
6.5	ZW	1030 [467]	39 [991]	25 [635]	245 [111]	191 [87]	260 [118]	333 [151]
7.5	ZW	1050 [476]	39 [991]	25 [635]	250 [113]	195 [89]	265 [120]	340 [154]
8.5	ZW	1060 [481]	38 [965]	24 [610]	247 [112]	184 [84]	268 [122]	360 [163]
10	ZW	1070 [485]	39 [991]	24 [610]	245 [111]	191 [87]	278 [126]	357 [162]
8.5 & 10	ZK	1200 [544]	38 [965]	25.5 [648]	297 [135]	221 [100]	291 [132]	390 [177]
6.5	XA	1080 [490]	38 [965]	25 [635]	262 [119]	195 [89]	266 [121]	357 [162]
7.5	XA	1090 [494]	38 [965]	23 [584]	243 [110]	181 [82]	284 [129]	381 [173]
8.5	XA	1137 [516]	38 [965]	25.5 [648]	282 [128]	210 [95]	276 [125]	370 [168]
10	XA	1135 [515]	38 [965]	25.5 [648]	281 [127]	209 [95]	275 [125]	369 [167]

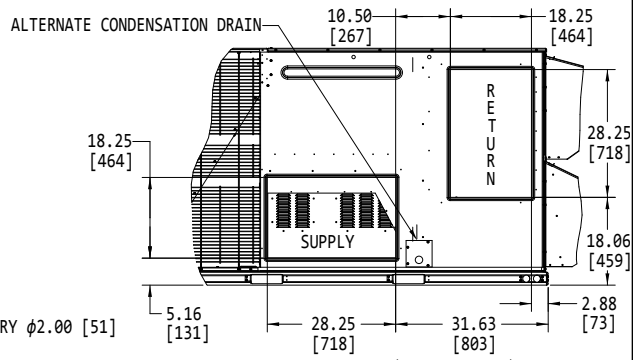


DETAIL A

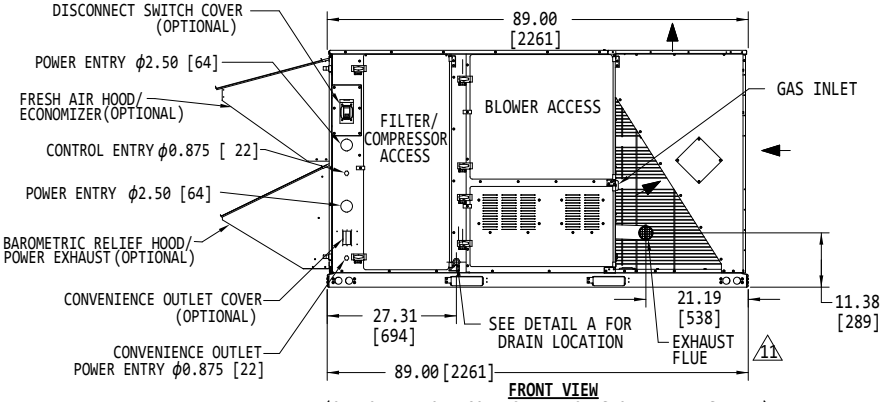


LEFT VIEW

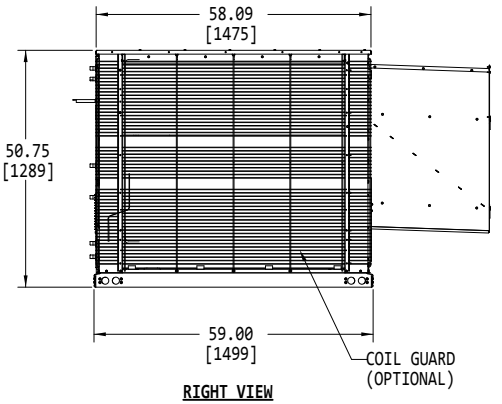




REAR (PARTIAL VIEW)
(INTAKE HOOD NOT SHOWN IN THIS VIEW)



FRONT VIEW
(OPTIONAL FRONT COIL GUARD NOT SHOWN IN THIS VIEW)



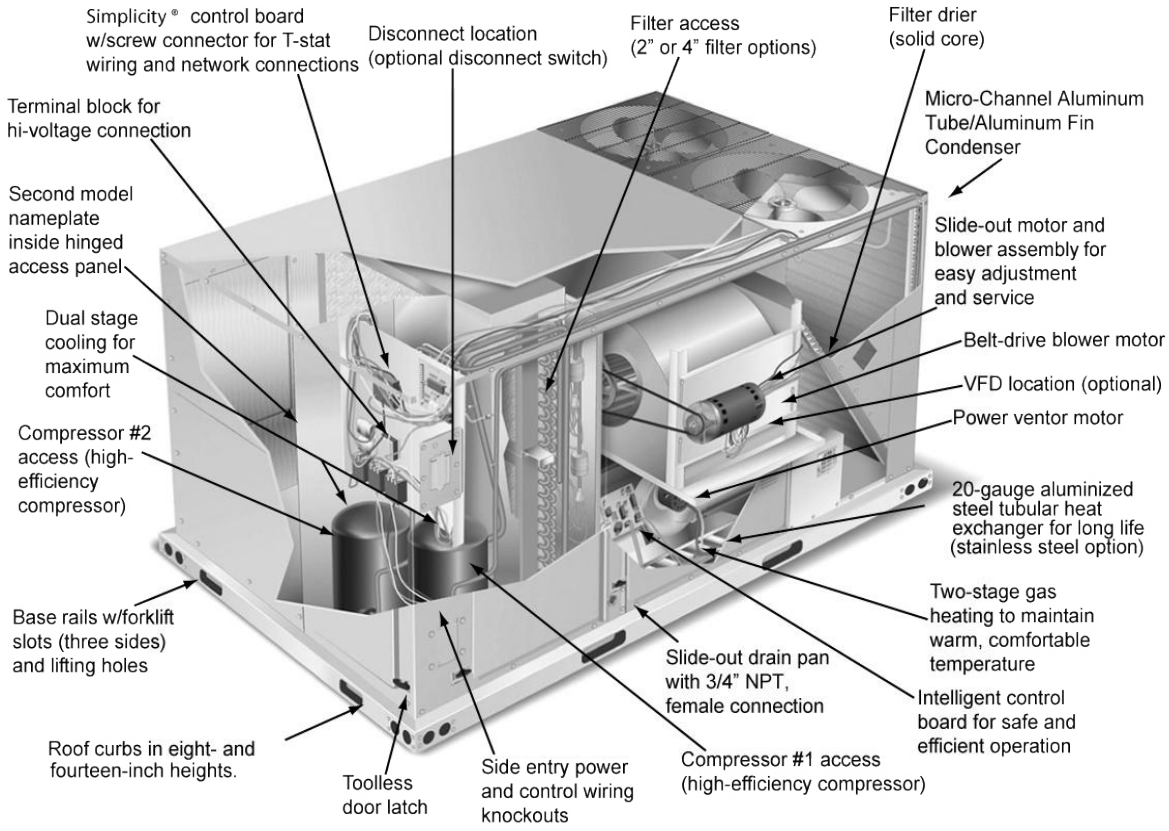
RIGHT VIEW

Project Name: **Jail HVAC Remediation** Unit Model #: **ZW-07N12AWAZZ5**

Quantity: **1** System: **ZW-07N12AWAZZ5**

Component Location

6 1/2 Through 10 Tons



SUBMITTAL MicroMetl

FORM NO. 11217-1P | DATE: 4/10

SUBMITTED TO: _____
COMPANY: _____
DRAWN BY: _____
JOB NAME: _____
EQUIPMENT: _____
NOTES: _____

HORIZONTAL ECONOMIZER WITH MODULATING CENTRIFUGAL POWER RELIEF FOR YORK PREDATOR BP,DF,DH,DM,XP,ZF,ZH,ZJ,ZR 078-102; DR 090-102 Units

Part Number:
1844-0200-MA130
4844-0200-MA130

Power Relief Specifications

Voltage	Part #	CFM Performance vs. Static In. WG.				Full Load Amps	HP	Wt. Lbs.
		0.1	0.2	0.25	0.3			
208/230/3ph	1844-0200-MA130	3100	2700	2460	2200	3.4/3.3	1	225
460/3ph	4844-0200-MA130					1.7		

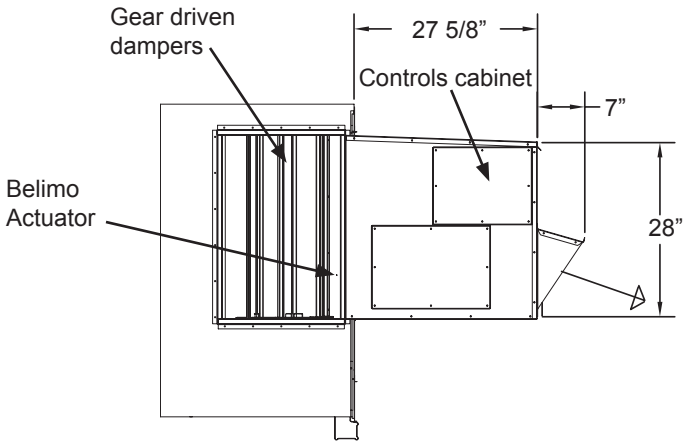
Note:
1. For proper wire sizing to the unit, add full load amps and MicroMetl full load amps.
2. External static would be specific to each job and may include return air duct, dampers in return air and/or return grilles.

FEATURES

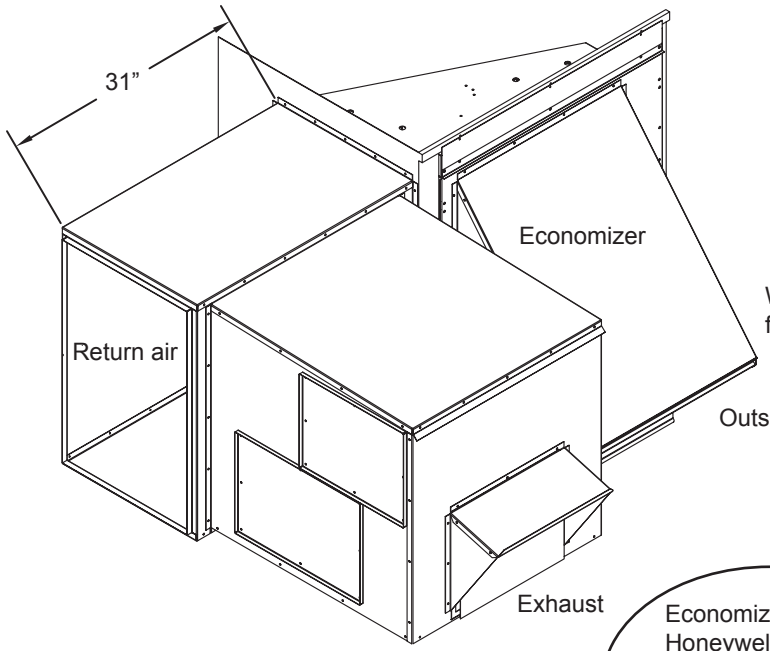
- Blower motor includes automatic internal thermal protection.
- Blower motor includes adjustable pulley.
- Electrical components are isolated from the air stream in an electrical box.
- Blowers have prelubricated ball bearings with rubber isolators and a dynamically balanced wheel.
- Hinged access door for motor and pulley access.
- Separate panel to access electrical components.
- Modulates relief based on space pressure.

Required clearance for service and operation

Exhaust hood side	24”
Outside air side	24”
Access door side	36”
Unit top	36”



SIDE VIEW



Economizer Includes Honeywell W7212 controller capable of CO2 demand Control and power exhaust activation switch.

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Date
10/17/2014
Project Name
Jail HVAC Remediation
Project Number
Client / Purchaser

Guide Specification Summary Page

Product Series	Models and Unit Tags
6.5-12.5 Ton Package	ZW-07N12AWAZZ5

GENERAL

Units shall be manufactured by Unitary Products in an ISO 9001 certified facility. Luxaire Ovation units are convertible single packages with a common footprint cabinet and common roof curb for all 6-1/2 through 12-1/2 ton models. All units have two compressors with independent R-410A refrigeration circuits to provide 2 stages of cooling. The units were designed for light commercial applications and can be easily installed on a roof curb, slab, or frame. All units are self-contained and assembled on rigid full perimeter base rails allowing for 3-way forklift access and overhead rigging. Every unit is completely charged with R-410A, wired, piped, and tested at the factory to provide a quick and easy field installation. All units are convertible between side and down airflow. Independent economizer designs are used on side and down discharge applications, as well as all tonnage sizes. Units are available in the following configurations: cooling only, cooling with electric heat, cooling with gas heat, reheat only, reheat with electric heat, reheat with gas heat, heat pump and heat pump with electric heat. Electric heaters are available as factory-installed options or field-installed accessories.

DESCRIPTION

Units shall be factory assembled, single package, (Elec/Elec, Gas/ Elec), designed for outdoor installation. They shall have built in field convertible duct connections for down discharge supply/return or horizontal discharge supply/return and be available with factory installed options or field installed accessories. The units shall be factory wired, piped and charged with R-410A refrigerant and factory tested prior to shipment. All unit wiring shall be both numbered and color coded. The cooling performance shall be rated in accordance with DOE and AHRI test procedures. Units shall be CSA certified to ANSI Z21.47 and UL 1995/CAN/CSA No. 236-M90 standards.

UNIT CABINET

Unit cabinet shall be constructed of galvanized steel with exterior surfaces coated with a non-chalking, powder paint finish, certified at 1000 hour salt spray test per ASTM-B117 standards. Indoor blower sections shall be insulated with up to 1” thick insulation coated on the airside. Either aluminum foil faced or elastometric rubber insulation shall be used in the unit’s compartments and be fastened to prevent insulation from entering the air stream. Cabinet doors shall be hinged with toolless access for easy servicing and maintenance. Full perimeter base rails shall be provided to assure reliable transit of equipment, overhead rigging, fork truck access and proper sealing on roof curb applications. Disposable 2” filters shall be furnished as standard and be accessible through hinged access door. Fan performance measuring ports shall be provided on the outside of the cabinet to allow accurate air measurements of evaporator fan performance without removing panels or creating bypass of the coils. Condensate pan shall be slide out design, constructed of a non corrosive material, internally sloped and conforming to ASHRAE 62-B9 standards. Condensate connection shall be a minimum of ¾” I.D. female and be rigid mount connection.

OUTDOOR (CONDENSER) FAN ASSEMBLY

The outdoor fans shall be of the direct drive type, discharge air vertically, have aluminum blades riveted to corrosion resistant steel spider brackets and shall be dynamically balanced for smooth operation. The outdoor fan motors shall have permanently lubricated bearings internally protected against overload conditions and staged independently. A cleaning window shall be provided on two sides of the units for coil cleaning.

REFRIGERANT COMPONENTS

Compressors:

a. Shall be fully hermetic type, direct drive, internally protected with internal high-pressure relief and over temperature protection. The hermetic motor shall be suction gas cooled and have a voltage range of + or – 10% of the unit nameplate voltage.
b. Shall have internal spring isolation and sound muffling to minimize vibration and noise, and be externally isolated on a dedicated, independent mounting.

Coils:

a. Evaporator coils shall have aluminum plate fins mechanically bonded to seamless internally enhanced copper tubes with all joints brazed. Special Phenolic coating shall be available as a factory option.
b. Evaporator coils shall be of the direct expansion, draw-thru design.
c. Condenser coils shall have aluminum plate fins mechanically bonded to seamless internally enhanced copper tubes with all joints brazed or Micro-Channel aluminum tube, aluminum fins. Special Phenolic coating shall be available as a factory option.
d. Condenser coils shall be of the draw-thru design.

Refrigerant Circuit and Refrigerant Safety Components shall include:

a. Independent fixed-orifice or thermally operated expansion devices.
b. Solid core filter drier/strainer to eliminate any moisture or foreign matter.

c. Accessible service gage connections on both suction and discharge lines to charge, evacuate, and measure refrigerant pressure during any necessary servicing or troubleshooting, without losing charge.

d. The unit shall have two independent refrigerant circuits, equally split in 50% capacity increments.

Unit Controls:

a. Unit shall be complete with self-contained low-voltage control circuit protected by a resettable circuit breaker on the 24-volt transformer side.

b. Unit shall incorporate a lockout circuit which provides reset capability at the space thermostat or base unit should any of the following standard safety devices trip and shut off compressor:
   - Loss-of-charge/Low-pressure switch.
   - High-pressure switch.
   - Freeze-protection thermostat, evaporator coil. If any of the above safety devices trip, an LED (light-emitting diode) indicator shall flash a diagnostic code that indicates which safety switch has tripped.

c. Unit shall incorporate “AUTO RESET” compressor over temperature, over current protection.

d. Unit shall operate with conventional thermostat designs and have a low voltage terminal strip for easy hook-up.

e. Unit control board shall have on-board diagnostics and fault code display.

f. Standard controls shall include anti-short cycle and low voltage protection, and permit cooling operation down to 0 ºF.

g. Control board shall monitor each refrigerant safety switch independently.

h. Control board shall retain last 5 fault codes in non-volatile memory, which will not be lost in the event of a power loss.

GAS HEATING SECTION

Heat exchanger and exhaust system shall be constructed of aluminized steel and shall be designed with induced draft combustion with post purge logic, energy saving direct spark ignition, and redundant main gas valve. The heat exchanger shall be of the tubular type, constructed of T1-40 aluminized steel for corrosion resistance and allowing minimum mixed air entering temperature of 40 ºF. Burners shall be of the in-shot type, constructed of aluminum-coated steel. All gas piping shall enter the unit cabinet at a single location, through either the side or bottom, without any field modifications. An integrated control board shall provide timed control of evaporator fan functioning and burner ignition. Heating section shall be provided with the following minimum protection:

a. Primary and auxiliary high-temperature limit switches.

b. Induced draft pressure sensor.

c. Flame proving controls.

d. All two stage gas units shall have two independent stages of capacity (70% or 75% 1st stage, 100% 2nd stage) 3 through 5 ton and (60% 1st stage, 100% 2nd stage) 6-1/2 through 12-1/2 ton.

UNIT OPERATING CHARACTERISTICS

Unit shall be capable of starting and running at 125 ºF outdoor temperature, exceeding maximum load criteria of AHRI Standard 340/360. The compressor, with standard controls, shall be capable of operation down to 0 ºF outdoor temperature. Unit shall be provided with fan time delay to prevent cold air delivery before heat exchanger warms up. (Gas heat only)

ELECTRICAL REQUIREMENTS - All unit power wiring shall enter unit cabinet at a single factory provided location and be capable of side or bottom entry to minimize roof penetrations and avoid unit field modifications. Separate side and bottom openings shall be provided for the control wiring.

STANDARD LIMITED WARRANTIES - Compressor – 5 Years, Heat Exchanger – 10 Years, Stainless Steel Heat Exchanger – 15 Years, Elect. Heat Elem. – 5 Years, Parts – 1 Year.

FACTORY INSTALLED OPTIONAL OUTDOOR AIR (Shall be made available by either/or):

ADDITIONAL FACTORY INSTALLED OPTIONS

- **BAS Controls** – Include supply air sensor, return air sensor, dirty filter indicator and air proving switch.

FIELD INSTALLED OPTIONS

Date
10/17/2014
Project Name
Jail HVAC Remediation
Project Number
Client / Purchaser

Control Summary Page

Control	Models and Unit Tags
Simplicity Intelli-Comfort II with SLinc	ZW-07N12AWAZZ5

General Description

Equipment with Simplicity® as standard shall be factory run-tested through the unit controller. All control wiring points shall be tested and verified through communication.

The unit controller shall be UL or CSA recognized. The unit controller shall be manufactured in a manufacturing facility that is certified to ISO 9001.

A brief description of the Intelli-Comfort II board's I/O terminals that are used follows:

Name	Type	Signal	Description
DUCT PRES	Analog Input	0-5VDC	Factory-installed duct static pressure transducer located in the unit's control box
BLDG PRES	Analog Input	0-5VDC	Factory-installed building static pressure transducer located in the unit's control box
OH	Analog Input	0-10VDC	Field-installed outdoor air relative humidity sensor for single or dual enthalpy economizer configuration
RH	Analog Input	0-10VDC	Field-installed return air relative humidity sensor for dual enthalpy economizer configuration (used with OH) and reheat control.
DH	Analog Input	0-10VDC	Field-installed supply air relative humidity sensor, used for monitoring duct humidity.
IAQ	Analog Input	0-10VDC	Field-installed carbon dioxide sensor which monitors indoor air quality (CO2 concentration) and enables call for Demand Ventilation mode for units installed with economizer option.
QAQ	Analog Input	0-10VDC	Field-installed carbon dioxide sensor which monitors outdoor air quality (CO2 concentration) and, along with IAQ, enables call for Differential Demand Ventilation mode for units installed with economizer option.
SAT	Analog Input	10K Type 3 Thermistor	Factory-installed temperature sensor located in the unit's supply air compartment.
RAT	Analog Input	10K Type 3 Thermistor	Factory-installed temperature sensor located in the unit's return air compartment.
OAT	Analog Input	10K Type 3 Thermistor	Factory-installed temperature sensor located in the outdoor air compartment or mounted within the evaporator base rail for units without the installed economizer option.
ST	Analog Input	10K Type 3 Thermistor	Field-installed space temperature sensor. Unoccupied override accomplished by shorting ST and C.
SSO	Analog Input	10K Type 3 Thermistor	Field-installed space temp sensor with override (0-20K with 10K being no offset).
APS	Binary Input	24VAC	Field-installed air proving switch which monitors the pressure difference across the indoor blower. (could be used with current sensing switch or sail switch)
DFS	Binary Input	24VAC	Factory-installed or field-installed dirty filter switch which monitors the pressure difference across the unit’s filters
PUR	Binary Input	24VAC	Building purge calls from an external source
OCC	Binary Input	24VAC	Used to set the building occupancy status for the unit controller
LIMIT2	Binary Input	24VAC	Confirms 2nd-stage gas heat operation or receives an error signal from the variable frequency drive.

FAN	Analog Output	2-10VDC	Output signal sent to the VFD to modulate the speed of the indoor blower motor
ECON	Analog Output	2-10VDC	Output signal sent to the economizer actuator to modulate position of the return air and outdoor air dampers
EXH	Analog Output	0-10VDC	Output signal sent to modulating power exhaust control(VFD or mod dampers)to maintain building static pressure
HWV	Analog Output	2-10VDC	Output signal sent to a field installed Hot Water Coil to maintain supply air temperature.
EXH~	Binary Output	24VAC	Signal used to turn on/off the power exhaust relay.
HGR	Binary Output	24VAC	Output signal used to turn on/off the Hot Gas Reheat Valve.
H1	Binary Output	24VAC	Output signal used to turn on/off the first stage of heating
H2	Binary Output	24VAC	Output signal used to turn on/off the second stage of heating
VAV BOX	Binary Output	N.O. Relay	Used to drive the building's VAV boxes to full-open during heating operation.

SEQUENCE OF OPERATION

VARIABLE AIR VOLUME (VAV) Operation

A variable air volume (VAV) option using a variable frequency drive (VFD) shall be available for applications requiring a constant supply duct static pressure. A differential pressure transducer shall monitor supply duct static pressure and return a speed reference signal to the VFD to control the output of the indoor blower motor.

DUCT STATIC PRESSURE Control

A 0-5" WC pressure transducer, located in the control box compartment, shall sense static (gauge) pressure in the supply air duct and convert this pressure measurement to a proportional 0-5 VDC electrical output.

Pressure-transmitting plastic tubing (1/4" diameter) shall be field supplied and installed from the transducer to both the ductwork and to the atmosphere. Connect the tubing from the 'HIGH' pressure tap of the transducer to a static pressure tap (field supplied) in the supply duct located at a point where constant pressure is expected. To prevent an unstable signal due to air turbulence, there should be no obstructions, turns or VAV terminal boxes up- or down-stream of the sensing tube location for at least a distance of 6-10 times the duct diameter. Tubing must also be run between the 'LOW' pressure tap of the transducer and atmospheric pressure (outside of the unit).

The Intelli-Comfort II control board is used to convert the pressure transducer input signal into a speed reference signal that the drive uses to control the speed of the blower motor. This modulating speed reference signal is generated using an algorithm which continuously calculates an output value.

<u>Programmable set points:</u>

The duct static set point is the pressure that the drive will maintain when operating the unit in VAV mode. The set-point is adjustable between 0" WC and 5" WC with the default setting of 1.5" WC.

The duct static high-limit set point is the maximum allowable duct pressure to prevent damage from over-pressurization of the ductwork in the event of either a drive or damper failure. The high-limit set-point shall be adjustable between 0" WC and 5" WC with the factory default setting of 4.5" WC. If the duct static pressure reaches the high-limit set point, then the supply fan motor shall shut down.

NOTE: Either of the set points described above shall be adjustable through the unit control board (UCB) with the use of a USB-to-RS485 converter, personal computer or PDA and a down-loaded copy of the Simplicity® software available at the UPGnet Commercial Product Catalog website.

Refer to the Intelli-Comfort II Data Map table at the end of this document for a complete list of the board's pro-grammable set points and defaults.

FACTORY-INSTALLED VFD

The factory-installed VFD shall be mounted in the Blower Access Compartment. The drive shall be factory wired to include both 3-phase power and control connections (run permit signal, speed reference signal and fault signal).

All required drive parameters shall be pre-programmed at the factory.

For units also equipped with gas/electric heat, a terminal block located in the unit's control box and connected to the Intelli-Comfort II board's "VAV BOX" terminal, shall be field wired to the building's VAV boxes to ensure fully open dampers during heating operation.

MANUAL BYPASS VFD

An optional, factory-installed manual bypass switch shall be available with factory-installed VFD can be found in the Blower Motor Access compartment and has the following three positions:

- **DRIVE** - routes power through the VFD for modulating control of the indoor blower motor.

• **LINE (or BYPASS)** - routes power directly to the motor which provides full-speed motor operation and complete electrical isolation of the drive.

• **TEST** - routes power to the VFD but not to the motor to allow for drive programming and/or diagnostics.

If a drive failure occurs, the unit does not automatically switch to bypass mode. The LINE/DRIVE/TEST switch must be manually switched to the LINE (BYPASS) position. If there is a call for the fan, the indoor blower motor will run at full-speed while in the bypass mode.

VFD without VAV controller (BAS Ready)

This optional configuration does not contain the Intelli-Comfort II control board. Terminal blocks are provided in the control box (in place of the Intelli-Comfort II control board)for field wiring of a customer-installed BAS to receive 24 VAC power and to connect to the following control signals:

- a duct static pressure transducer input signal (0-5 VDC) (DPT transducer is factory installed)
- an economizer actuator output signal (2-10 VDC)
- a VFD speed reference output signal (2-10 VDC)

The use of shielded cable is recommended for the ab
ove control wiring connections.

'VFD-READY' FOR CUSTOMER-INSTALLATION

Units configured as 'Customer Supplied VFD' shall provide provisions for a customer-installed drive.

The unit shall be provided with a mounting bracket installed in the Blower Access compartment which may accommodate other vendor's drives depending on their size. In order to utilize the unit's mounting bracket, the maximum recommended drive dimensions are as follows:

For 5-hp motor applications .....13" H x 6" W x 7" D

For 7.5 thru 15-hp motor applications .....13" H x 8" W x 8" D

If the drive will not fit in the allotted space, then it will need to be mounted elsewhere; either within the building on a perpendicular wall which is not subjected to excessive temperature, vibration, humidity, dust, corrosive gas, explosive gas, etc., or within an appropriate enclosure rated for outside installation to safeguard against moisture, dust and excessive heat.

The power leads to the drive (L1, L2, L3) and from the motor (T1, T2, T3) along with the respective ground wires are supplied with the unit and need to be connected after the drive is installed.

A terminal block located in the control box shall be provided for field connection of the VFD speed reference signal (2-10 VDC) and to the normally-open, run-permit auxiliary contact.

The use of shielded cable is recommended for the above control wiring connections.

For VFD-ready units also equipped with gas/electric heat, a terminal block located in the unit's control box and connected to the Intelli-Comfort II board's "VAV BOX" terminal, shall be field wired to the building's VAV boxes to ensure fully open dampers during heating operation.

Constant Volume (CV) Operation

Space Sensor Control Option

Units configured as 'Space Sensor controlled' shall provide for constant volume operation with a wall mounted space sensor. Unit Controller shall have the capability of accepting Occupied and Unoccupied temperature settings.

Unit Controller shall operate from the factory installed Return Air Temperature Sensor in the absence of a space sensor.

Thermostat Only Control Option

Units configured as 'Thermostat controlled' shall provide for constant volume operation with a standard wall mounted space thermostat.

IntelliSpeed Supply Fan Control Option

Units configured as 'IntelliSpeed Supply Fan Operation' shall provide for variable volume supply fan operation with a standard wall mounted space thermostat or space sensor.

Supply fan shall be equipped with a VFD to modulate the supply fan speed. The fan shall operate at high speed (adjustable) when equipment is operating at full cooling or heating capacity. The fan shall operate at medium speed (adjustable) when equipment is operating at reduced cooling or heating capacity. The fan shall operate at low speed (adjustable) when equipment is operating in a fan only operation.

Economizer shall have the capability of changing the minimum damper position based on the supply fan speed.

SIMPLICITY® COMPRESSOR CONTROL

1. The unit controller shall have a five-minute Anti-Short Cycle Delay to prevent excessive compressor cycling.
2. The unit controller shall have a three-minute minimum run time to insure that oil is returned to the compressor each time it starts. The minimum runtime shall be programmable up to 10 minutes.

3. The unit controller shall monitor the High Pressure switch and Low Pressure switch separately for each refrigeration circuit.
4. The unit controller shall have a 30 second Low Pressure Switch bypass when it starts any compressor.
5. A hard compressor lockout shall occur if the unit controller detects the same switch trip three times in a two-hour window, which starts when the first trip occurs. On the first and second trips, the unit controller will turn the compressor off and wait five-minutes after the switch recloses, before restarting the compressor.
6. The unit controller shall be capable of operating both compressors and the economizer when there is a call for both stages of cooling.
7. The unit controller shall have a means of locking out mechanical compression below a programmable low ambient trip point. This must be done without adding extra components to the unit.
8. The unit controller shall have a means of locking out the mechanical compression when the economizer is operating in free cooling mode without additional components.
9. The unit controller shall have a means of starting the compressor before the indoor Fan comes on when operating with a Thermostat in the AUTO FAN mode.

EQUIPMENT CONTROL FEATURES

1. The unit controller shall be capable of communicating on the Standard Open protocol, MODBUS RTU.
2. The register data for the MODBUS shall be publicly available and open.
3. Monitoring software shall be provided at no cost. The monitoring software shall have a flashing icon when any unit wired to the computer has an alarm. Clicking the flashing icon shall display the fault code and the details of the fault.
4. The networking setup shall be completed by connecting a three-wire daisy chain cable to each unit, then powering all the units up and pushing a button on each control. There shall not be any dip switches to configure the network address.
5. The unit controller shall use a communication driver that is capable of having 64 nodes on the bus before a repeater is needed.
6. The unit controller shall use non-volatile memory to store the last five alarms. There shall be a single button to push to recall these last five alarms. The alarms shall be stored first in last out. The first flash code shall be the last alarm that occurred. There shall be a button press sequence to clear the alarms in non-volatile memory.
7. The unit controller shall have a button to reset compressor lockouts without powering the unit down.
8. The unit controller shall have a button to clear compressor Anti- Short Cycle Delays (ASCDs). When this button is pressed it will only clear the ASCDs for one cycle only and not permanently.
9. The unit controller shall be compatible with any BAS (Building Automation System). Any BAS shall be able to control the equipment when wired to the control's Thermostat Terminal Strip.
10. The unit controller shall have loading of at least 25 milliamps on all thermostat inputs for controllers and thermostats that use output TRIACs.
11. The unit controller shall have a Smoke Detector Shutdown input on the board. The unit controller shall be powered through this input, so when the Smoke Detector trips, the unit controller will shut down the unit immediately.
12. The unit controller shall have low voltage protection for the contactors and will not energize a contactor if the voltage is below 19.2 VAC, to insure contactor pull-in. If the unit controller has a compressor contactor energized when the voltage drops, it shall not de-energize the contactor until the voltage drops below 16 VAC, which is the drop out voltage for most contactors.
13. The unit controller shall have a means of low ambient control without adding any additional components. The unit controller shall have a means of cycling the compressor on for 10 minutes and off for 5 minutes to defrost the indoor coil when the outside ambient is below a low ambient switch point without adding additional components.
14. The unit controller shall have a means of storing compressor run time. This data shall be available through communication. The unit controller shall have the ability to clear this data when a compressor is replaced.
15. The unit controller shall have the ability to store a name of at least 26 characters in length. The unit controller will leave the factory with the serial number of the equipment it is in, stored in non-volatile memory in the Name location.
16. The unit controller shall have the ability to store the model number of the equipment of at least 26 characters in length. The unit controller will leave the factory with the model number of the equipment it is in, stored in nonvolatile memory.
17. The unit controller shall have the ability to store the serial number of the equipment of at least 26 characters in

length. The unit controller will leave the factory with the serial number of the equipment it is in, stored in non-volatile memory.

18. The unit controller shall not power the contactors through the thermostat wiring. Dropping voltage over the thermostat wiring causes chattering contactors when the contactors are powered in this manner.
19. The unit controller shall operate and monitor up to 2 stages of heat independently.
20. The unit controller shall monitor the Gas Heat operation in the heating mode. It shall monitor the gas valve when there is a call for heating. The unit controller shall alarm when there is a call for heat and no gas valve voltage after 5 minutes.

COMFORT CONTROL FEATURES

1. The unit controller shall be installed and tested at the factory where the equipment is assembled.
2. The unit controller shall use a Wall Sensor that has a means of overriding the unoccupied mode for a programmable amount of time.
3. The Unoccupied Override time shall be programmed in minutes up to 4 hours.
4. The unit controller shall use a Wall Sensor that has a warmer/cooler dial so the occupants can offset the programmed setpoint by a programmed amount between 1 and 5 degrees fahrenheit.
5. The unit controller shall have a Supply Air Sensor as standard.
6. The unit controller shall have a Return Air Sensor as standard.
7. The unit controller shall have an Outside Air Sensor as standard.
8. The unit controller shall use the Return Air Sensor in place of the Space Sensor if the Space Sensor fails for any reason.
9. The unit controller shall have a 365 day Real Time Clock.
10. Real Time Clock shall be able to do automatic Daylight Savings Time adjustment.
11. The unit controller shall have an Occupancy Schedule that allows two different Occupied schedules per day for each of the seven days of the week individually.
12. The unit controller shall have 20 Holiday Schedules, each capable of 99 days.
13. The unit controller's Holiday Schedules shall have a start time associated with each schedule.
14. The unit controller shall control the Economizer directly.
15. The unit controller shall be capable of operating the Economizer using Dry Bulb, Outside Enthalpy, or Differential Enthalpy.
16. When the unit controller is using Enthalpy to control the Economizer, it shall also have an Outside Air Temperature enable Setpoint.
17. The unit controller shall use two setpoints for Supply Air Temperature for the Economizer operation. One will be for a small space cooling demand and one for a large space cooling demand.
18. The unit controller shall have the ability to perform Demand Ventilation using one CO2 sensor.
19. The unit controller shall have a programmable maximum Outside Air Damper Position for IAQ operation.
20. The unit controller shall have the ability to temper the ventilation air during times when heating or cooling is not required.
21. The unit controller shall have the ability to offset the operating setpoint based on high Humidity in the Space.
22. The unit controller shall have programmable limits when offsetting the Operating Setpoint to control Humidity.
23. The unit controller shall be able to lockout Cooling below a programmable Outside Air Temperature Setpoint.
24. The unit controller shall be able to lockout Heating above a programmable Outside Air Temperature Setpoint.
25. The unit controller shall have a Space Temperature Alarm.
26. The unit controller shall have a Supply Air Temperature Alarm for Heating and Cooling. The Alarm temperature will be programmable.
27. The Unit controller shall be able to perform a Pre-Occupancy Purge at a Programmable Time.
28. The unit controller shall have a hardware Smoke-Purge input.
29. The unit controller shall have the ability to read a dirty filter switch.
30. The unit controller shall have the capability of reading a fan proving switch.
31. The unit controller shall have an intelligent recovery function that will bring the space to the Occupied Setpoint just before or at the beginning of the first Occupied schedule each day. The unit controller will learn and apply the minimum run time required to heat or cool the space to setpoint for the first Occupied period of a day.
32. The unit controller shall have Software controllable Mode Switches (Heat, Cool, and Fan).
33. The unit controller shall meter and track Unoccupied Override Time for billing purposes.

Intelli-Comfort II Data Map

September, 2012

Writing to any register not in this list may cause erratic operation

This product is not designed to accept continuous writes to data stored in long term memory. It is recommended that no stored value be changed more often than an average of once per hour. Changing data more often risks damaging the ability of the control to store new data for the full life of the product.

Addr (Hex)	Addr (Dec)	Bit	Init/ Default	Min Value	Max Value	Description
00 H	0 H	NA	20	NA	NA	Device ID = 1B (G/E), 1C (HP)
00 L	0 L	NA	-	0	255	Device Software Revision
01 H	1 H	NA	22	-	-	Option Byte #1
		0				Bits 1 and 0 = 0,0 respectively there are 0 stages of heat;
		1				0,1 = 1 stage; 1,0 = 2 stages; 1,1 = 3 stages
		2				1 = Heating mode enabled for operation
		3				1 = Turn off continuous fan when starting heat
		4				1 = Cooling mode enabled for operation
		5				1 = economizer loading active
		6				1 = Space Sensor Fault override enabled
		7				1 = VAV, 0 = CV
01 L	1 L	NA	NA	NA	NA	Active Alarm
02 H	2 H	NA	30	0	30	Fan On Delay for Heat (Seconds)
02 H	2 H	NA	60	0	255	Fan Off Delay for Heat (Seconds)
03 H	3 H	NA	60	0	30	Fan On Delay for Cool (Seconds)
03 L	3 L	NA	30	0	255	Fan Off Delay for Cool (Seconds)
04 H	4 H	NA	60	0	255	Low Ambient Fan Pre-Run Time
04 L	4 L	NA	3	1	10	Minimum run time for compressors (Minutes)
05 H	5 H	NA	0	0	255	Heating #1 accumulated run time (Hours, high byte)
05 L	5 L	NA	0	0	255	Heating #1 accumulated run time (Hours, low byte)
06 H	6 H	NA	0	0	255	Heating #2 accumulated run time (Hours, high byte)
06 L	6 L	NA	0	0	255	Heating #2 accumulated run time (Hours, low byte)
08 H - 14 L	8 H - 20 L	NA				Registers 8 - 20 store the Unit Name. When written, all 13 registers (at 2 bytes per register) should be written. The format is ASCII. Character #1 is in 8 H. Character #2 is in 8 L. Character #3 is in 9 H, and so on.
15 H	21 H	NA	-	-	-	Input Status Byte #1
		0				1 = Y1 ON (Cooling 1st Stage)
		1				1 = Y2 ON (Cooling 2nd Stage)
		2				1 = Y3 ON (Cooling 3rd Stage)
		3				1 = Y4 ON (Cooling 4th Stage)
		4				1 = W1 ON (Heating 1st Stage)
		5				1 = W2 ON (Heating 2nd Stage)
		6				NA
		7				1 = G ON (Indoor Fan)

Addr (Hex)	Addr (Dec)	Bit	Init/ Default	Min Value	Max Value	Description
15 L	21 L	NA	-	-	-	Input Status Byte #2
		0				1 = HPS1 CLOSED (not tripped)
		1				1 = HPS2 CLOSED
		2				1 = HPS3 CLOSED
		3				1 = HPS4 CLOSED
		4				1 = LPS1 CLOSED (not tripped)
		5				1 = LPS2 CLOSED
		6				1 = LPS3 CLOSED
		7				1 = LPS4 CLOSED
16 H	22 H	NA	-	-	-	Input Status Byte #3
		0				NA
		1				NA
		2				NA
		3				NA
		4				1 = Purge Switch CLOSED (active)
		5				1 = OCC Input ON
		6				1 = AUX Input high
		7				1 = Dirty Filter CLOSED (dirty condition)
16 L	22 L	NA	-	-	-	Input Status Byte #4
		0				1 = Gas Valve #1 ON
		1				1 = Gas Valve #2 ON
		2				NA
		3				1 = Limit #1 Closed (not tripped)
		4				1 = Limit #2 Closed
		5				NA
		6				NA
		7				NA
17 H	23 H	NA	-	-	-	Input Status Byte #5
		0				1 = Fan Overload CLOSED (not tripped)
		1				1 = Freeze Stat CLOSED (not Low Temp)
		2				1 = Air Proving CLOSED (Air Flow is sensed)
		3				1 = Low Ambient Condition
		4				1 = Space Sensor detected
		5				NA
		6				NA
		7				1 = Low 24 VAC Supply Voltage
17 L	23 L	NA	-	-	-	Input Status Byte #6
		0				1 = Program Button Pressed
		1				1 = Test / Up Button Pressed
		2				1 = Alarms / Change Button Pressed
		3				1 = Address / Down Button Pressed
		4				1 = FS1 Closed (not tripped)
		5				1 = FS2 Closed (not tripped)
		6				1 = FS3 Closed (not tripped)
		7				1 = FS4 Closed (not tripped)

Addr (Hex)	Addr (Dec)	Bit	Init/ Default	Min Value	Max Value	Description
18 H	24 H	NA	-	-	-	Output Status Byte #1
		0				1 = Compressor #1 ON
		1				1 = Compressor #2 ON
		2				1 = Compressor #3 ON
		3				1 = Compressor #4 ON
		4				1 = Condenser Fan #1 ON
		5				1 = Condenser Fan #2 ON
		6				1 = Indoor Fan ON
		7				1 = Exhaust Fan ON
18 L	24 L	NA	-	-	-	Output Status Byte #2
		0				1 = Stage 1 Heat ON
		1				1 = Stage 2 Heat ON
		2				NA
		3				1 = Hot Gas Reheat ON
		4				NA
		5				NA
		6				1 = Cooling is Active
		7				1 = Heating is Active
19 H	25 H	NA	-	-	-	Output Status Byte #3
		0				1 = Compressors OFF because Free Cooling is available
		1				1 = Compressors OFF because of Low Ambient
		2				1 = Compressors OFF because supply voltage is low
		3				1 = Control is in Comfort Ventilation mode
		4				1 = Disable Control is Active
		5				1 = Economizer is using Free Cooling
		6				1 = Free Cooling is Available
		7				1 = Occupied is current status
19 L	25 L	NA	-	-	-	Output Status Byte #4
		0				1 = Compressor #1 OFF because of ASCD
		1				1 = Compressor #2 OFF because of ASCD
		2				1 = Compressor #3 OFF because of ASCD
		3				1 = Compressor #4 OFF because of ASCD
		4				NA
		5				NA
		6				NA
		7				NA
1A H	26 H	NA	12	-	-	Option Byte #2
		0				Bits 1 and 0 = 0,0 respectively there are 2 stages of compression; 0,1 = 3 stages; 1,0 = 4 stages; 1,1 = 4
		1				stages
		2				1 = SAT Limit for Cooling enabled
		3				1 = SAT Limit for Heating enabled
		4				1 = Hydronic heating enabled
		5				1 = Hydronic heat actuator valve reverse acting
		6				1 = Remote Control input enabled for third party BAS
		7				1 = Hot Gas Reheat enabled

Addr (Hex)	Addr (Dec)	Bit	Init/ Default	Min Value	Max Value	Description
1A L	26 L	NA	4	-	-	Option Byte #3
		0				1 = VAV Occupied heating enabled
		1				1 = VAV Unoccupied heating enabled
		2				1 = Economizer present
		3				1 = Outside Air Humidity sensor present
		4				1 = Return Air Humidity sensor present
		5				1 = Pre-occupancy purge enabled
		6				1 = Demand Ventilation enabled
		7				1 = Building pressure sensor installed
1B H	27 H	NA	193	-	-	Option Byte #4
		0				1 = Power exhaust present
		1				1 = Modulating power exhaust present
		2				1 = Exhaust VFD present
		3				1 = Low Ambient kit installed
		4				1 = Dirty Filter switch present
		5				1 = Intelli-start operation enabled
		6				1 = Indoor fan operates with space sensor present [CV]
		7				1 = Daylight savings time enabled
1B L	27 L	NA	8	-	-	Option Byte #5
		0				1 = Run test enabled
		1				1 = Meter of unoccupied override enabled
		2				1 = Metric display enabled
		3				1 = Use Thermostat or Communications flag for Occupied signal
		4				1 = Lead/Lag: Equalize compressor run time enabled
		5				1 = Hot gas bypass present on compressor #1
		6				1 = Remote Control of Economizer enabled
		7				1 = Morning warm-up enabled
1C H	28 H	NA	0	0	255	Alarm 1 - Most recent alarm.
1C L	28 L	NA	0	0	255	Alarm 2
1D H	29 H	NA	0	0	255	Alarm 3
1D L	29 L	NA	0	0	255	Alarm 4
1E H	30 H	NA	0	0	255	Alarm 5 – Oldest stored Alarm.
1F H	31 H	NA	0	0	255	Compressor #1 accumulated run time (Hours, High byte)
1F L	31 L	NA	0	0	255	Compressor #1 accumulated run time (Hours, Low byte)
20 H	32 H	NA	0	0	255	Compressor #2 accumulated run time (Hours, High byte)
20 L	32 L	NA	0	0	255	Compressor #2 accumulated run time (Hours, Low byte)
21 H	33 H	NA	0	0	255	Compressor #3 accumulated run time (Hours, High byte)
21 L	33 L	NA	0	0	255	Compressor #3 accumulated run time (Hours, Low byte)
22 H	34 H	NA	0	0	255	Compressor #4 accumulated run time (Hours, High byte)

Addr (Hex)	Addr (Dec)	Bit	Init/ Default	Min Value	Max Value	Description
22 L	34 L	NA	0	0	255	Compressor #4 accumulated run time (Hours, Low byte)
24 H	36 H	NA	1	1	250	Requested address change (Bus address)
25 H	37 H	NA	0	0	NA	Comm Options
		0				1 = Accept Comm Value for ST (Space Temp)
		1				1 = Accept Comm Value for RH
		2				1 = Accept Comm Value for OH
		3				1 = Accept Comm Value for OAT
		4				1 = Ignore Address button single push
		5				1 = Accept Comm Value for IAQ
		6				1 = Accept Comm Value for OAQ
		7				1 = Accept Comm Value for Space Sensor Offset
26 L	38 L	NA	NA	NA	NA	Requested Operation
		0				1 = Request for 1st stage Cooling
		1				1 = Request for 2nd stage Cooling
		2				1 = Request for 3rd stage Cooling
		3				1 = Request for 4th stage Cooling
		4				1 = Request for 1st stage Heating
		5				1 = Request for 2nd stage Heating
		6				1 = Request for 3rd stage Heating
		7				1 = Request for Fan
27 H - 33 L	39 H - 51 L	NA				Registers 39 - 51 store the Model Number. When written, all 13 registers (at 2 bytes per register) should be written. The format is ASCII. Character #1 is in 39 H. Character #2 is in 39 L. Character #3 is in 40 H, and so on.
34 H - 40 L	52 H - 64 L	NA				Registers 52 - 64 store the Serial Number. When written, all 13 registers (at 2 bytes per register) should be written. The format is ASCII. Character #1 is in 52 H. Character #2 is in 52 L. Character #3 is in 53 H, and so on.
41 H	65 H	NA				Stage Lockouts
		0				1 = Lockout 1st stage Cooling
		1				1 = Lockout 2nd stage Cooling
		2				1 = Lockout 3rd stage Cooling
		3				1 = Lockout 4th stage Cooling
		4				1 = Lockout 1st stage Heating
		5				1 = Lockout 2nd stage Heating
		6				NA
		7				NA
41 L	65 L	NA	NA	NA	NA	Redline/Loadshed status (5 minute timer is started each write. Value is cleared if timer is allowed to finish.)
		0				1 = Set Redline operation
		1				1 = Set Loadshed operation
		2 - 7				Bits 2-7 Unused
42 L	66 L		255			Clear lockout status
						Write "00" to clear all lockouts. Any other value is ignored. Always reads 255.

Addr (Hex)	Addr (Dec)	Bit	Init/ Default	Min Value	Max Value	Description
43 H	67 H		-	0	255	Reading this address returns EEPROM checksum High byte
43 L	67 L		-	0	255	Reading this address returns EEPROM checksum Low byte
44 H	68 H		4	0	99	Real Time Clock Year Value
44 L	68 L		1	1	12	Real Time Clock Month Value
45 H	69 H		1	1	31	Real Time Clock Day of Month Value
45 L	69 L		1	1	7	Real Time Clock Day of Week Value
46 H	70 H		0	0	23	Real Time Clock Hour Value
46 L	70 L		0	0	59	Real Time Clock Minute Value
47 H	71 H		72	46	99	Occupied Cooling Setpoint (CV only)
47 L	71 L		68	45	98	Occupied Heating Setpoint (CV & VAV)
48 H	72 H		85	46	99	Un-Occupied Cooling Setpoint (CV only)
48 L	72 L		60	45	98	Un-Occupied Heating Setpoint (CV & VAV)
49 H	73 H		0	0	23	Day 1 – Occupied hour #1
49 L	73 L		0	0	59	Day 1 – Occupied minute #1
4A H	74 H		0	0	23	Day 1 – Un-Occupied hour #1
4A L	74 L		0	0	59	Day 1 – Un-Occupied minute #1
4B H	75 H		0	0	23	Day 1 – Occupied hour #2
4B L	75 L		0	0	59	Day 1 – Occupied minute #2
4C H	76 H		0	0	23	Day 1 – Un-Occupied hour #2
4C L	76 L		0	0	59	Day 1 – Un-Occupied minute #2
4D H - 50 L	77 H - 80 L		NA	NA	NA	Day 2 (Same format as day #1)
51 H - 54 L	81 H - 84 L		NA	NA	NA	Day 3 (Same format as day #1)
55 H - 58 L	85 H - 88 L		NA	NA	NA	Day 4 (Same format as day #1)
59 H - 5C L	89 H - 92 L		NA	NA	NA	Day 5 (Same format as day #1)
5D H - 60 L	93 H - 96 L		NA	NA	NA	Day 6 (Same format as day #1)
61 H - 64 L	97 H - 100 L		NA	NA	NA	Day 7 (Same format as day #1)
65 H	101 H		0	0	12	Holiday #1 – Start month
65 L	101 L		0	0	31	Holiday #1 – Start day of month
66 H	102 H		0	0	23	Holiday #1 – Start hour
66 L	102 L		0	0	59	Holiday #1 – Start minute
67 L	103 L		0	0	99	Holiday #1 – Number of days
68 H - 6A L	104 H - 106 L		NA	NA	NA	Holiday #2 (Same Format as Holiday #1)
6B H - 6D L	107 H - 109 L		NA	NA	NA	Holiday #3 (Same Format as Holiday #1)
6E H - 6D L	110 H - 112 L		NA	NA	NA	Holiday #4 (Same Format as Holiday #1)
71 H - 70 L	113 H - 115 L		NA	NA	NA	Holiday #5 (Same Format as Holiday #1)
74 H - 76 L	116 H - 118 L		NA	NA	NA	Holiday #6 (Same Format as Holiday #1)
77 H - 76 L	119 H - 121 L		NA	NA	NA	Holiday #7 (Same Format as Holiday #1)

Addr (Hex)	Addr (Dec)	Bit	Init/ Default	Min Value	Max Value	Description
7AH-7CL	122H-124L		NA	NA	NA	Holiday #8(Same Formal as Holiday #1)
7DH-7FL	125H-127L		NA	NA	NA	Holiday #9(Same Formal as Holiday #1)
80H-82L	128H-130L		NA	NA	NA	Holiday #10(Same Formal as Holiday #1)
83H-85L	131H-133L		NA	NA	NA	Holiday #11(Same Formal as Holiday #1)
86H-88L	134H-136L		NA	NA	NA	Holiday #12(Same Formal as Holiday #1)
89H-8BL	137H-139L		NA	NA	NA	Holiday #13(Same Formal as Holiday #1)
8CH-8EL	140H-142L		NA	NA	NA	Holiday #14(Same Formal as Holiday #1)
8FH-91L	143H-145L		NA	NA	NA	Holiday #15(Same Formal as Holiday #1)
92H-94L	146H-148L		NA	NA	NA	Holiday #16(Same Formal as Holiday #1)
95H-97L	149H-151L		NA	NA	NA	Holiday #17(Same Formal as Holiday #1)
98H-9AL	152H-154L		NA	NA	NA	Holiday #18(Same Formal as Holiday #1)
9BH-9DL	155H-157L		NA	NA	NA	Holiday #19(Same Formal as Holiday #1)
9EH-A0L	158H-160L		NA	NA	NA	Holiday #20(Same Formal as Holiday #1)
A1 H	161 H		-	0	255	Supply Air Temperature (1/10 degrees, High byte, 16 bit value, 0 = -40 degrees F)
A1 L	161 L		-	0	255	Supply Air Temperature (1/10 degrees, Low byte, 16 bit value, 0 = -40 degrees F)
A2 H	162 H		-	0	255	Outside Air Temperature (1/10 degrees, High byte, 16 bit value, 0 = -40 degrees F)
A2 L	162 L		-	0	255	Outside Air Temperature (1/10 degrees, Low byte, 16 bit value, 0 = -40 degrees F)
A3 H	163 H		-	0	255	Return Air Temperature (1/10 degrees, High byte, 16 bit value, 0 = -40 degrees F)
A3 L	163 L		-	0	255	Return Air Temperature (1/10 degrees, Low byte, 16 bit value, 0 = -40 degrees F)
A4 H	164 H		-	0	255	Space Sensor temperature (room air) (1/10 degrees, High byte, 16 bit value, 0 = -40 degrees F)
A4 L	164 L		-	0	255	Space Sensor temperature (room air) (1/10 degrees, Low byte, 16 bit value, 0 = -40 degrees F)
A5 L	165 L		3	0	5	Space Sensor offset range (degrees)
A6 H	166 H		-	0	100	Supply Duct Air Humidity (%)
A6 L	166 L		-	0	100	Return Air Humidity (%)
A7 L	167 L		-	0	100	Outside Air Humidity (%)
A8 H	168 H		-	0	255	Demand Ventilation (IAQ) value (PPM value, High byte)
A8 L	168 L		-	0	255	Demand Ventilation (IAQ) value (PPM value, Low byte)

Addr (Hex)	Addr (Dec)	Bit	Init/ Default	Min Value	Max Value	Description
A9 H	169 H		-	0	255	Building pressure value (0.001” WC, High byte, 0 = -0.250” WC, max = 0.250” WC)
A9 L	169 L		-	0	255	Building pressure value (0.001” WC, Low byte, 0 = -0.250” WC, max = 0.250” WC)
AA H	170 H		-	0	255	Duct Pressure value (0.01” WC, High byte, 0 = 0.00” WC, max = 5.00” WC)
AA L	170 L		-	0	255	Duct Pressure value (0.01” WC, Low byte, 0 = 0.00” WC, max = 5.00” WC)
AB H	171 H		0	0	200	Remote Control input value (0.05 VDC counts) (cooling SAT setpoint or Economizer)
AB L	171 L		40	0	200	Demand Ventilation setpoint (25 PPM increments,maximum 5000 PPM)
AC H	172 H		80	0	200	Outdoor Air Quality sensor range (25 PPM increments,maximum 5000 PPM)
AC L	172 L		80	0	200	Air Quality (DV) sensor range (25 PPM increments,maximum 5000 PPM)
AD L	173 L		60	0	240	Unoccupied override time period (minutes)
AE H	174 H		45	0	100	Outdoor Air Temperature cooling lockout temperature (degrees F, 0 = disabled)
AE L	174 L		75	0	100	Outdoor Air Temperature heating lockout temperature(degrees F, 0 = disabled)
AF H	175 H		50	40	65	SAT Cooling Limit setpoint (degrees F)
AF L	175 L		135	100	180	SAT Heating Limit setpoint (degrees F)
B0 H	176 H		120	80	179	Hydronic heating stage #1 supply air setpoint (degrees F)
B0 L	176 L		150	81	180	Hydronic heating stage #2 supply air setpoint (degrees F)
B1 H	177 H		80	60	85	Comfort ventilation upper setpoint (degrees F)
B1 L	177 L		70	60	85	Comfort ventilation lower setpoint (degrees F)
B2 H	178 H		60	41	70	VAV cooling Supply Air Temperature: upper setpoint (degrees F)
B2 L	178 L		55	40	69	VAV cooling Supply Air Temperature: lower setpoint (degrees F)
B3 H	179 H		72	40	85	VAV cooling Supply Air Temperature: Reset Setpoint degrees F)
B3 L	179 L					Unused
B4 H	180 H		70	50	85	Morning Warm-Up and VAV heating: Return Air Temperature setpoint (degrees F)
B4 L	180 L		40	40	60	SAT Tempering with Hydronic Heat Setpoint
B5 H	181 H		60	0	200	Duct pressure setpoint (0.025” WC increments, default = 1.500” WC ↔ 60)
B5 L	181 L		180	0	200	Duct pressure shutdown setpoint (0.025” WC increments, default = 4.500” WC ↔ 180)
B6 H	182 H		70	0	100	Building pressure setpoint (0.005” WC increments, 0 = -0.250” WC, default = 0.100” WC ↔ 70)
B8 H	184 H		20	0	100	Economizer minimum position (percent)
B8 L	184 L		25	0	100	Economizer minimum position (percent) for Low Speed Fan

Addr (Hex)	Addr (Dec)	Bit	Init/ Default	Min Value	Max Value	Description
B9 H	185 H		27	10	50	Economizer outside air enthalpy setpoint (BTU per pound)
B9 L	185 L		27	10	50	Economizer return air enthalpy setpoint (BTU per pound) (unused)
BA H	186 H		55	40	80	Economizer Outside Air Temperature enable setpoint degrees F)
BA L	186 L		10	0	100	Percent of REM input that is the Minimum Outdoor Air Supply
BB H	187 H		4	0	23	Pre-occupancy purge time (hours)
BB L	187 L		0	0	59	Pre-occupancy purge time (minutes)
BC H	188 H		80	10	100	Exhaust damper position for exhaust fan to turn on –Modulating only (percent)
BC L	188 L		20	0	90	Exhaust damper position for exhaust fan to turn off –Modulating only (percent)
BD H	189 H		60	10	100	Economizer damper position for exhaust fan to turn on– Non-modulating only (percent)
BD L	189 L		20	0	90	Economizer damper position for exhaust fan to turn off – Non-modulating only (percent)
BE H	190 H		0	0	80	Supply Air Temperature alarm setpoint for cooling (degrees F, 0 = disabled)
BE L	190 L		0	0	120	Supply Air Temperature alarm setpoint for heating (degrees F, 0 = disabled)
BF H	191 H		5	0	25	Space Sensor alarm temperature (degrees F, 0 = disabled)
BF L	191 L		60	0	120	Space Sensor alarm time (minutes, 0 = disabled)
C2 H	194 H		0	0	255	Intelli-start recovery time (minutes, 0 = disabled)
C3 H	195 H		-	-	-	ASCD Timer for Compressor #1 High byte
C3 L	195 L		-	-	-	ASCD Timer for Compressor #1 Low Byte. (Seconds,counts down)
C4 H	196 H		-	-	-	ASCD Timer for Compressor #2 High Byte
C4 L	196 L		-	-	-	ASCD Timer for Compressor #2 Low Byte (Seconds,counts down)
C5 H	197 H		-	-	-	ASCD Timer for Compressor #3 High byte
C5 L	197 L		-	-	-	ASCD Timer for Compressor #3 Low Byte. (Seconds,counts down)
C6 H	198 H		-	-	-	ASCD Timer for Compressor #4 High Byte
C6 L	198 L		-	-	-	ASCD Timer for Compressor #4 Low Byte (Seconds, counts down)
C7 H	199 H		0	-	-	Compressor #1 Minimum Run timer high byte (Seconds, counts down)
C7 L	199 L		0	-	-	Compressor #1 Minimum Run timer low byte (Seconds, counts down)
C8 H	200 H		0	-	-	Compressor #2 Minimum Run timer high byte (Seconds, counts down)
C8 L	200 L		0	-	-	Compressor #2 Minimum Run timer low byte (Seconds,counts down)
C9 H	201 H		0	-	-	Compressor #3 Minimum Run timer high byte (Seconds,counts down)
C9 L	201 L		0	-	-	Compressor #3 Minimum Run timer low byte (Seconds,counts down)

Addr (Hex)	Addr (Dec)	Bit	Init/ Default	Min Value	Max Value	Description
CA H	202 H		0	-	-	Compressor #4 Minimum Run timer high byte (Seconds,counts down)
CA L	202 L		0	-	-	Compressor #4 Minimum Run timer low byte (Seconds, counts down)
CB H	203 H		-	-	-	Fan ASCD Timer High byte (Always zero)
CB L	203 L		-	-	-	Fan ASCD Timer Low byte. (Seconds, counts down)
CC H	204 H		0	-	-	Fan Minimum Run Timer (Seconds, counts down)
CD H	205 H		0	-	-	Fan On Delay Timer for Heat (Seconds, count down)
CD L	205 L		0	-	-	Fan Off Delay Timer for Heat (Seconds, count down)
CE H	206 H		0	-	-	Fan On Delay Timer for Cool (Seconds, count down)
CE L	206 L		0	-	-	Fan Off Delay Timer for Cool (Seconds, count down)
CF H	207 H		0	0	255	Accumulated Unoccupied Override time (Hours, High byte)
CF L	207 L		0	0	255	Accumulated Unoccupied Override time (Hours, Low byte)
D4 H	212 H		-	0	100	Supply Fan VFD Output Status, 0-100% (2 – 10 VDC)
D4 L	212 L		-	0	100	Exhaust Damper Output Status, 0-100% (2 – 10 VDC)
D4 L	212 L		-	0	100	Exhaust Damper Output Status, 0-100% (2 – 10 VDC)
D5 H	213 H		-	0	100	Hot Water Valve Output Status, 0-100% (2 – 10 VDC)
D5 L	213 L		-	0	100	Hot Gas Reheat Valve Output Status, 0-100% (2 – 10 VDC)
D6 H	214 H		-	0	100	Economizer Damper Output Status, 0-100% (2 – 10 VDC)
D7 H	215 H	NA	0	-	-	Option Byte #6
		0				1 = Comfort ventilation for cooling enabled
		1				1 = Comfort ventilation for heating enabled
		2				1 = Temperature / Humidity control enabled
		3				1 = Hot gas reheat alternate operation enabled
		4				1 = Network Occupied flag: OCC is On
		5				1 = Differential Air Quality enable
		6				1 = Differential enthalpy mode enabled
		7				1 = Variable Heat Proportional Output
D7 L	215 L	NA	64	-	-	Option Byte #7
		0				1 = ERV enabled
		1				1 = ERV Unoccupied Fan enabled
		2				1 = Lockout Compressors in Free Cooling
		3				1 = Lockout Compressors in Low Ambient
		4				1 = Variable Hot Gas Reheat enable
		5				1 = Thermostat Only Control enable
		6				1 = Limit 2: Input for VFD failure
		7				1 = SAT Tempering w/ Hydronic Heat enable
D8 H	216 H		50	0	100	Hot gas reheat humidity setpoint (percent humidity)
D8 L	216 L		50	20	80	Temperature / Humidity setpoint (percent humidity)
D9 H	217 H		3	0	5	Maximum Temperature / Humidity offset (degrees F)

Addr (Hex)	Addr (Dec)	Bit	Init/ Default	Min Value	Max Value	Description
D9 L	217 L		5	1	10	Temperature / Humidity value that = 1° F of offset (percent humidity)
DA H	218 H		1	1	5	Unused
DB H	219 H		72	45	99	Operating Cooling Setpoint (degrees F)
DB L	219 L		68	45	99	Operating Heating Setpoint (degrees F)
DC H	220 H		-	10	50	Outside air enthalpy (BTUs per pound)
DC L	220 L		-	10	50	Return air enthalpy (BTUs per pound)
DD H	221 H		NA	0	255	Outside Demand Ventilation (OAQ) value (PPM value, High byte)
DD L	221 L		NA	0	255	Outside Demand Ventilation (OAQ) value (PPM value, Low byte)
DE H	222 H		24	0	200	Differential Air Quality (IAQ/OAQ) setpoint (25 PPM increments, maximum 5000 PPM)
DE L	222 L		50	0	100	Maximum Demand Ventilation economizer position (percent open)
DF H	223 H		-	0	10	Space Sensor Offset (0 = -5° F, 10 = +5° F)
DF L	223 L		28	0	80	Unused
E0 H	224 H		-	-	-	ASCD Timer for Heating stage #1 (seconds, counts down)
E0 L	224 L		-	-	-	Heating stage #1 Minimum Run timer (seconds, counts down)
E1 H	225 H		-	-	-	ASCD Timer for Heating stage #2 (seconds, counts down)
E1 L	225 L		-	-	-	Heating stage #2 Minimum Run timer (seconds, counts down)
E3 H	227 H		0	0	99	Low Ambient economizer minimum position (percent) 0 = disabled
E3 L	227 L		0	0	60	Low Ambient economizer setpoint (degrees F) 0 = disabled
E4 H	228 H			40	70	Operating Cooling SAT Setpoint (degrees F)
E4 L	228 L			80	180	Operating Heating SAT Setpoint (degrees F)
E5 H	229 H		50	0	100	CV-VFD: OCC, No Heat or Cool
E6 H	230 H		70	0	100	CV-VFD: OCC, C1 only
E6 L	230 L		100	0	100	CV-VFD: OCC, H1 only
E7 H	231 H		100	0	100	CV-VFD: OCC, All C outputs are On
E7 L	231 L		100	0	100	CV-VFD: OCC, All H outputs are On
E8 H	232 H		-	0	255	SLT: Suction Line Temperature (1/10 degrees, High byte, 16 bit value, 0 = -40 degrees F)
E8 L	232 L		-	0	255	SLT: Suction Line Temperature (1/10 degrees, Low byte, 16 bit value, 0 = -40 degrees F)
E9 H	233 H		-	0	255	LLT: Liquid Line Temperature (1/10 degrees, High byte, 16 bit value, 0 = -40 degrees F)
E9 L	233 L		-	0	255	LLT: Liquid Line Temperature (1/10 degrees, Low byte, 16 bit value, 0 = -40 degrees F)
EA H	234 H		-	0	255	EST: Evaporator Saturation Temperature (1/10 degrees, High byte, 16 bit value, 0 = -40 deg. F)
EA L	234 L		-	0	255	EST: Evaporator Saturation Temperature (1/10 degrees, Low byte, 16 bit value, 0 = -40 deg. F)

Addr (Hex)	Addr (Dec)	Bit	Init/ Default	Min Value	Max Value	Description
EB H	235 H		-	0	255	CST: Condenser Saturation Temperature (1/10 degrees, High byte, 16 bit value, 0 = -40 deg. F)
EB L	235 L		-	0	255	CST: Condenser Saturation Temperature (1/10 degrees, Low byte, 16 bit value, 0 = -40 deg. F)
EC H	236 H	NA	0	-	-	Option Byte #8
		0				1 = APS present
		1				1 = Enable Outdoor Air Supply at REM input
		2				NA
		3				NA
		4				NA
		5				NA
		6				NA
		7				NA
EC L	236 L	NA	0	-	-	Option Byte #9
		0				NA
		1				NA
		2				NA
		3				NA
		4				NA
		5				NA
		6				NA
		7				NA
ED H	237 H	NA	0	-	-	Option Boards Present
		0				1 = 4-Stage board present
		1				1 = VAV board present
		2				NA
		3				NA
		4				NA
		5				NA
		6				NA
		7				NA